

Closed Loop Waste Processing Dryer (DRYER), Phase I

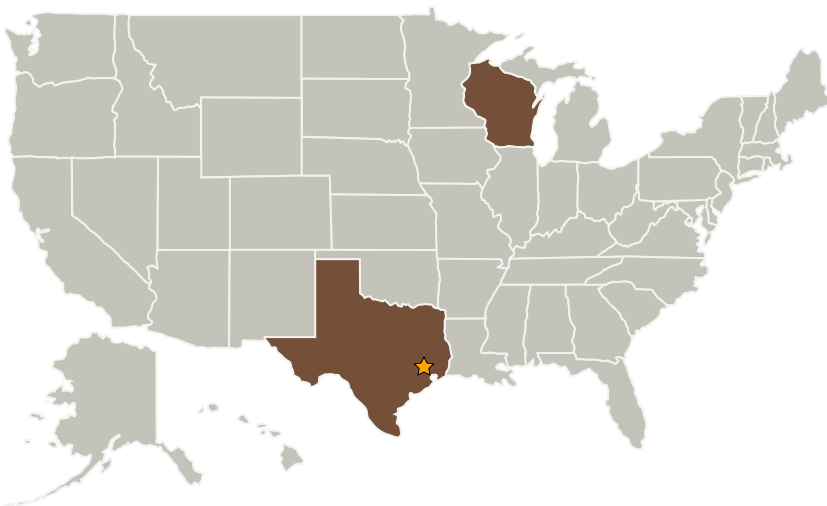
Completed Technology Project (2004 - 2005)



Project Introduction

The objective of this proposal is to develop a gravity-independent pasteurization and hot air drying process suitable for stabilization of ALS wet cabin waste, drying of crew laundry, and water recovery from water-reprocessing brines. This dryer will use an energy-efficient closed air-loop Heat Pump Desiccant dryer to remove moisture from wet starting material and a Porous Membrane Condensing Heat Exchanger (PMCHX) to trap condensate. Water recovered during drying should be of good quality and available for reuse with standard processing. The process is energy efficient since enthalpy released by the condensing vapor is used to reheat the drying air. Volatile organic compounds are contained throughout the drying process. The system could incorporate a photocatalytic oxidation system to remove VOCs accumulated during drying. The key objective for the PMCHX is to extend its range of application from low-load humidity control in plant growth chambers to high-load condenser duty at up to 80°C air temperature and at temperatures varying over a 40°C range during a single drying run. Since the presence of organics in the condensate, and the predicted condenser temperatures of 5-40°C are conditions favorable to biofilm growth, PMCHX membranes will need to be configured to inhibit the formation of biofilms.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Orbital Technologies Corporation	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Madison, Wisconsin

Primary U.S. Work Locations

Texas	Wisconsin
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.4 Mission Success Technologies
 - └ TX13.4.2 Team Preparedness and Training